What is claimed is:

1. In a communication system comprising a plurality of subscriber units and a transmitting communication device having an antenna array comprised of a plurality of array elements, a method for antenna beamforming comprising a step of jointly optimizing a plurality of weighting coefficients to produce a plurality of optimized weighting coefficients, wherein each optimized weighting coefficient of the plurality of optimized weighting coefficients is associated with an element of the plurality of elements and is further associated with a subscriber unit of the plurality of subscriber units.

2. The method of claim 1, further comprising steps of:

modulating a plurality of signals to produce a plurality of modulated signals, wherein each signal of the plurality of signals is modulated based on an optimized weighting coefficient of the plurality of optimized weighting coefficients;

transmitting each modulated signal of the plurality of modulated signals via an array element of the plurality of array elements.

3. The method of claim 1, wherein the step of jointly optimizing a plurality of weighting coefficients comprises a step of determining values for the plurality of weighting coefficients that jointly maximize a signal-to-noise ratio for each subscriber unit of the plurality of subscriber units.

4. The method of claim 1, wherein the step of jointly optimizing a plurality of weighting coefficients comprises a step of jointly optimizing a plurality of weighting coefficients based on information concerning a plurality of propagation channels and an autocorrelation of background interference and wherein each propagation channel of the plurality of propagation channels is a propagation channel between a subscriber unit of the plurality of subscriber units and an array element of the plurality of array elements.

5. In a communication system comprising a plurality of subscriber units and a transmitting communication device having an antenna array comprised of a plurality of array elements, a method for antenna beamforming comprising steps of:

approximating one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) to produce an approximation of the joint optimization expression of an SNR; and

independently optimizing a set of weighting coefficients of a plurality of sets of weighting coefficients based on the approximation of the joint optimization expression of an SNR to produce a set of optimized weighting coefficients, wherein each set of optimized weighting coefficients of the plurality of sets of optimized weighting coefficients corresponds to a subscriber unit of the plurality of subscriber units.

6. The method of claim 5, wherein each optimized weighting coefficient in a set of optimized weighting coefficients corresponds to an array element of the plurality of array elements and wherein the method further comprises steps of:

modulating a plurality of signals to produce a plurality of modulated signals, wherein each signal of the plurality of signals is modulated based on an optimized weighting coefficient of the set of optimized weighting coefficients;

transmitting each modulated signal of the plurality of modulated signals via an array element of the plurality of array elements.

7. The method of claim 5, wherein each subscriber unit of the plurality of subscriber units comprises a Rake receiver, wherein a covariance of an output of the Rake receiver of each subscriber unit comprises a contribution to the covariance by the other subscriber units of the plurality of subscriber units, wherein the step of approximating one or more terms in a joint optimization expression of an SNR comprises a step of approximating the covariance of an output of the Rake receiver of each subscriber unit with a contribution to the covariance by the other subscriber units.

8. The method of claim 5, wherein the transmitting communication device operates in an environment where inter-cell interference dominates intra-cell interference, wherein

the step of approximating one or more terms in a joint optimization expression of an SNR comprises a step of assuming that the ratio of intra-cell interference to inter-cell interference is equal to zero.

9. The method of claim 5, wherein the transmitting communication device operates in an environment where intra-cell interference dominates inter-cell interference, wherein the step of approximating one or more terms in a joint optimization expression of an SNR comprises a step of assuming that the ratio of intra-cell interference to inter-cell interference approaches infinity.

10. The method of claim 5, wherein the communication system further comprises a plurality of communication channels, wherein each communication channel of the plurality of communication channels is allocated to a subscriber unit of the plurality of subscriber units, wherein a power allocated by the transmitting communication device to each communication channel is a reasonable small fraction of the total power transmitted by the communication device, wherein each subscriber unit of the plurality of subscriber units comprises a Rake receiver, wherein a covariance of an output of the Rake receiver of each subscriber unit comprises a contribution to the covariance by the other subscriber units of the plurality of subscriber units, wherein the step of approximating one or more terms in a joint optimization expression of an SNR comprises a step of assuming that the covariance is equal to the contribution to the covariance by the other subscriber units of the plurality of subscriber units.

11. In a communication system comprising a plurality of subscriber units, a communication device comprising:

an antenna array comprising a plurality of array elements;

a plurality of weighters, wherein each weighter of the plurality of weighters is coupled to an element of the plurality of elements; and

a processor coupled to each weighter of the plurality of weighters, wherein the processor jointly optimizes a plurality of weighting coefficients and wherein each weighting coefficient of the plurality of weighting coefficients is associated with an element of the plurality of elements and is further associated with a subscriber unit of the plurality of subscriber units.

12. The communication device of claim 11, wherein when the communication device transmits data to a subscriber unit of the plurality of subscriber units, the processor provides to each weighter of the plurality of weighters the weighting coefficient associated with the subscriber unit and with the element coupled to the weighter, and wherein each weighter then modulates a signal based on the weighting coefficient received from the processor.

13. The communication device of claim 11, wherein the processor jointly optimizes a plurality of weighting coefficients by determining values for the plurality of weighting coefficients that jointly maximize a signal-to-noise ratio for each subscriber unit.

14. The communication device of claim 11, wherein the processor jointly optimizes a plurality of weighting coefficients based on information concerning a plurality of propagation channels and an autocorrelation of background interference and wherein each propagation channel of the plurality of propagation channels is a propagation channel between a subscriber unit of the plurality of subscriber units and an array element of the plurality of array elements.

15. In a communication system comprising a plurality of subscriber units, a communication device comprising:

an antenna array comprising a plurality of array elements;

a plurality of weighters, wherein each weighter of the plurality of weighters is coupled to an element of the plurality of elements; and

a processor coupled to each weighter of the plurality of weighters, wherein the processor approximates one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) to produce an approximation of the joint optimization expression of an SNR and independently optimizes a set of weighting coefficients of a plurality of sets of weighting coefficients based on the approximation of the joint optimization expression of an SNR to produce a set of optimized weighting coefficients, wherein each set of optimized weighting coefficients of the plurality of sets of optimized weighting coefficients corresponds to a subscriber unit of the plurality of subscriber units.

16. The communication device of claim 15, wherein each optimized weighting coefficient in a set of optimized weighting coefficients corresponds to an array element of the plurality of array elements, wherein when the communication device transmits data to a subscriber unit of the plurality of subscriber units, the processor provides to each weighter of the plurality of weighters an optimized weighting coefficient associated with the subscriber unit and with the element coupled to the weighter, and wherein each weighter then modulates a signal based on the weighting coefficient received from the processor.

17. The communication device of claim 15, wherein each subscriber unit of the plurality of subscriber units comprises a Rake receiver, wherein a covariance of an output of the Rake receiver of each subscriber unit comprises a contribution to the covariance by the other subscriber units of the plurality of subscriber units, wherein the processor approximates one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) by approximating the covariance to be equal to the contribution to the covariance by the other subscriber units.

18. The communication device of claim 17, wherein the approximation of the contribution to the covariance by the other subscriber units comprises the equation

$$\Omega_2 \approx \Omega_2^A = \frac{1}{2}\left(1 - \frac{E_c}{I_{or}}\right)\left(\Psi^{1,1} + \Psi^{2,2}\right) + \frac{I_{oc}}{I_{or}}\varphi(m-l).$$

19. The communication device of claim 17, wherein the approximation of the contribution to the covariance by the other subscriber units comprises the equation

$$\Omega_2 \approx \frac{I_{oc}}{I_{or}}\varphi(m-l).$$

20. The communication device of claim 17, wherein the approximation of the contribution to the covariance by the other subscriber units comprises the equation

$$\Omega_2 \approx \frac{1}{2}\left(1 - \frac{E_c}{I_{or}}\right)\left(\Psi^{1,1} + \Psi^{2,2}\right).$$

21. The communication device of claim 15, wherein the communication device operates in an environment where inter-cell interference dominates intra-cell interference, wherein the processor approximates one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) by assuming that the ratio of intra-cell interference to inter-cell interference is equal to zero.

22. The communication device of claim 15, wherein the communication device operates in an environment where intra-cell interference dominates inter-cell interference, wherein the processor approximates one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) by assuming that the ratio of intra-cell interference to inter-cell interference approaches infinity.

23. The communication device of claim 15, wherein the communication system further comprises a plurality of communication channels, wherein each communication channel of the plurality of communication channels is allocated to a subscriber unit of the

plurality of subscriber units, wherein a power allocated by the communication device to each communication channel is a reasonable small fraction of the total power transmitted by the communication device, wherein each subscriber unit of the plurality of subscriber units comprises a Rake receiver, wherein a covariance of an output of the Rake receiver of each subscriber unit comprises a contribution to the covariance by the other subscriber units of the plurality of subscriber units, wherein the processor approximates one or more terms in a joint optimization expression of a signal-to-noise ratio (SNR) by assuming that the covariance is equal to the contribution to the covariance by the other subscriber units of the plurality of subscriber units.